

CLAIMS

1. A method for providing stimulation in anticipation of an insult to cardiac tissue, comprising:

5 delivering electrical stimulation to one or more predetermined portions of the nervous system in a patient's body; and

 monitoring one or more physiologic indices of the body to determine whether the delivered therapy is effective.

10 2. The method of Claim 1, further comprising modifying the delivery of electrical stimulation based on the monitored physiologic indices.

15 3. The method of Claim 1, further comprising terminating delivery of electrical stimulation based on the monitored physiologic indices.

20 4. The method of Claim 1, and further comprising initiating delivery of electrical stimulation based on anticipating that exercise will occur.

25 5. The method of Claim 2, wherein modifying the delivery of electrical stimulation further comprises modifying one or more characteristics of a delivered electrical waveform.

30 6. The method of Claim 5, wherein modifying the one or more characteristics further comprises modifying one or more characteristics of the group comprised of amplitude, duration, frequency, duty cycle and waveform shape.

25 7. The method of Claim 2, wherein modifying the delivery of electrical stimulation based on the monitored physiologic indices further comprises modifying the delivery of electrical stimulation based on the monitored physiologic indices selected from the group comprised of physical activity, cardiac electrical activity, cardiac ischemia, neural activity, autonomic activity, hemodynamic condition, and blood chemistry.

30 8. The method of Claim 1, further comprising initiating delivery of electrical stimulation based upon an indication received from an external activator.

9. The method of Claim 1, further comprising initiating delivery of electrical stimulation at one or more predetermined times of the day.

10. The method of Claim 2, further comprising correlating the monitored physiologic indices to the delivered electrical stimulation.

11. The method of Claim 10, wherein modifying the delivery of electrical stimulation further comprises modifying the delivery of electrical stimulation based upon the correlations between the monitored physiologic indices and the delivered electrical stimulation.

10

12. The method of Claim 1, further comprising initiating delivery of electrical stimulation based on one or more monitored physiologic indices of the body.

15

13. The method of Claim 12, further comprising initiating delivery of electrical stimulation based on one or more monitored physiologic indices from the group comprising physical activity, cardiac electrical activity, cardiac ischemia, neural activity, autonomic activity, hemodynamic condition, and blood chemistry.

20

14. The method of Claim 1, wherein delivering electrical stimulation to one or more predetermined portions of the nervous system in the patients body further comprises delivering electrical stimulation to one or more predetermined portions of the nervous system comprising the group of a spinal cord, a cranial nerve, sympathetic ganglia, intrinsic cardiac neurons, and a peripheral nerves.

25

15. The method of Claim 14, wherein delivering electrical stimulation to the spinal cord further comprises delivering electrical stimulation to the spinal cord at one or more sites being selected from the group consisting of spinal levels T1-T12 and C1-C8.

30

16. The method of Claim 1, wherein delivering electrical stimulation further comprises delivering electrical stimulation to one or more types of electrodes selected from the group comprising externally positioned electrodes, subcutaneously-placed electrodes, and implanted electrodes positioned in proximity to the one or more predetermined nerves.

TOP SECRET - 10124.00

17. The method of Claim 1, and further including delivering a biologically-active agent in anticipation of the insult to the cardiac tissue.

18. The method of Claim 1, and further including providing a patient notification in
5 anticipation of the insult to the cardiac tissue.

19. The method of Claim 1, wherein delivering electrical stimulation is accomplished using at least one electrode selected from the group consisting of an implanted electrode, a subcutaneous electrode, and an externally-placed electrode.

10

20. A system to control delivery of electrical stimulation to one or more nerves in a body, comprising:

a sensing circuit to sense at least one physiologic parameter;

a stimulation circuit to provide the electrical stimulation to the one or more nerves; and

15

a control circuit coupled to the sensing circuit and to the stimulation circuit to control the stimulation circuit based on anticipation of an occurrence of a cardiac insult as indicated by the at least one physiologic parameter.

20

21. The system of Claim 20, wherein the control circuit includes a patient-activation mechanism.

22. The system of Claim 20, wherein the control circuit includes means for initiating the electrical stimulation in response to the at least one physiologic parameter sensed by the sensing circuit.

25

23. The system of Claim 20, wherein the control circuit includes means for altering the electrical stimulation in response to the at least one physiologic parameter sensed by the sensing circuit.

30

24. The system of Claim 20, wherein the control circuit includes means for ceasing the electrical stimulation in response to the at least one physiologic parameter sensed by the sensing circuit.

P-10124.00

-25-

25. The system of Claim 20, and further including means for notifying a patient of the anticipation of the occurrence of the cardiac insult.

26. The system of Claim 20, wherein the stimulation circuit includes at least one
5 implanted electrode.

27. The system of Claim 20, wherein the stimulation circuit includes at least one
subcutaneous electrode.

10 28. The system of Claim 20, wherein the stimulation circuit includes at least one
electrode positioned proximate an external surface of the body.

29. The system of Claim 20, and further including a storage device coupled to the
control circuit to store results of past electrical stimulation; and

15 wherein the control circuit include means for performing future electrical stimulation
based on the results of past electrical stimulation.

30. The system of Claim 20, and further including a drug delivery system coupled to
the control circuit to deliver biologically-active agents based on the anticipation of the
20 occurrence of the cardiac insult.

31. A device to provide electrical stimulation to at least one predetermined portion of
the nervous system in a patient's body, comprising:

means for sensing at least one physiologic indication in the patient's body;

25 means for providing stimulation to the at least one predetermined
portion of the nervous system in the patient's body; and

means for controlling the stimulation means to provide the stimulation based on an
indication of a probable future cardiac insult as determined by the at least one physiologic
indication in the patient's body.

30

32. An apparatus for protecting cardiac tissue from insult, comprising:
at least one electrode positionable at a region adjacent a patient's nervous tissue;
a sensing circuit to detect at least one physiologic parameter; and

PROTECTED BY U.S. PATENT & TRADEMARK OFFICE

-26-

a controller adapted to deliver electrical stimulation to the at least one electrode for a period of time prior to onset of an insult, wherein at least one parameter of the electrical stimulation is controlled as a function of the sensed physiologic parameter.

5 33. The apparatus of Claim 32, wherein the controller includes means for delivering electrical stimulation for a period of time after the onset of the insult.

10 34. The apparatus of Claim 33, wherein the controller includes means for delivering electrical stimulation for a period of time after the termination of the insult.

15 35. The apparatus of claim 32, and further including a circuit coupled to the controller to provide electrical stimulation to cardiac tissue.

15 36. The apparatus of claim 35, wherein the electrical stimulation comprises pacing

pulses.

TOP SECRET - FEDERAL BUREAU OF INVESTIGATION